

## CLAIMS

What is claimed is:

- 5           1.       A system for producing a coating, the system comprising:  
              a mixing reservoir;  
              an ultrasonic disperser for ultrasonically dispersing an additive with  
              another coating component within the mixing reservoir; and  
              a heat exchanger in communication with the mixing reservoir to  
10           receive a mixture of the additive and another coating component from the  
              mixing reservoir, to cool the mixture by thermal energy transfer from the  
              mixture to the heat exchanger, and to return the cooled mixture to the  
              mixing reservoir.
- 15           2.       The system of claim 1, wherein the heat exchanger comprises a  
              heat exchange coil at least partially positioned within a fluid to allow the mixture  
              flowing through the heat exchange coil to transfer thermal energy to the fluid.
- 20           3.       The system of claim 2, wherein the system includes:  
              a first conduit for communicating the mixture from the mixing  
              reservoir to the heat exchange coil; and  
              a second conduit for communicating the mixture from the heat  
              exchange coil to the mixing reservoir.
- 25           4.       The system of claim 3, wherein the system includes a pump for  
              pumping the mixture from the mixing reservoir, through the conduits and heat  
              exchange coil, and back to the mixing reservoir.
- 30           5.       The system of claim 1, wherein the ultrasonic disperser comprises a  
              sonotrode positionable within the mixing reservoir and a transducer for applying  
              energy to the sonotrode to generate ultrasonic energy.
6.       The system of claim 5, wherein the sonotrode is translatable  
              relative to the mixing reservoir.

7. The system of claim 1, further comprising a mechanical agitator for mechanically agitating the mixture within the mixing reservoir.

5 8. The system of claim 1, wherein the system is adapted for connection to a source of low pressure to reduce pressure of the system and to maintain the system at the reduced pressure.

9. The system of claim 1, wherein the additive comprises pigment particles.  
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10. The system of claim 1, wherein the another coating component comprises a binder.

11. The system of claim 1, wherein the another coating component  
15 comprises a solvent.

12. The system of claim 1, wherein the another coating component comprises a resin carrier.

20 13. The system of claim 1, wherein the system is adapted to maintain the mixture within a desired temperature range.

25 14. The system of claim 1, wherein the transferred thermal energy includes a substantial entirety of the thermal energy produced from the ultrasonic dispersing.

15. A system for producing a coating, the system comprising:  
a mixing reservoir;  
an ultrasonic disperser for ultrasonically dispersing an additive with  
another coating component within the mixing reservoir;  
5 a heat exchange coil;  
a first conduit for communicating a mixture of the additive and  
another coating component from the mixing reservoir to the heat exchange  
coil;  
a second conduit for communicating the mixture from the heat  
10 exchange coil to the mixing reservoir; and  
the heat exchange coil at least partially positioned within a fluid to  
allow thermal energy transfer from the mixture flowing through the heat  
exchange coil to the fluid.
16. The system of claim 15, further comprising a mechanical agitator for  
mechanically agitating the mixture within the mixing reservoir.
17. The system of claim 15, wherein the system includes a pump for  
pumping the mixture from the mixing reservoir, through the conduits and heat  
20 exchange coil, and back to the mixing reservoir.
18. The system of claim 15, wherein the ultrasonic disperser comprises  
a sonotrode positionable within the mixing reservoir and a transducer for applying  
energy to the sonotrode to generate ultrasonic energy.
- 25 19. The system of claim 18, wherein the sonotrode is translatable  
relative to the mixing reservoir.
20. The system of claim 15, wherein the system is adapted for  
30 connection to a source of low pressure to reduce pressure of the system and to  
maintain the system at the reduced pressure.

21. The system of claim 15, wherein the additive comprises pigment particles.

22. The system of claim 15, wherein the another coating component  
5 comprises a binder.

23. The system of claim 15, wherein the another coating component comprises a solvent.

10 24. The system of claim 15, wherein the another coating component comprises a resin carrier.

25. The system of claim 15, wherein the system is adapted to maintain the mixture within a desired temperature range.  
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26. The system of claim 15, wherein the transferred thermal energy includes a substantial entirety of the thermal energy produced from the ultrasonic dispersing.

27. A method of producing a coating, the method comprising:  
receiving a coating component within a mixing reservoir;  
receiving an additive within the mixing reservoir;  
ultrasonically dispersing the additive with the coating component  
5 within the mixing reservoir; and  
actively cooling a mixture of the additive and coating component by  
allowing thermal energy transfer therefrom.
28. The method of claim 27, wherein the actively cooling comprises  
10 maintaining the mixture within a desired temperature range.
29. The method of claim 27, wherein the actively cooling comprises  
transferring from the mixture a substantial entirety of the thermal energy  
produced by the ultrasonic dispersing.  
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30. The method of claim 27, further comprising mechanically agitating  
the mixture.
31. The method of claim 27, further comprising:  
20 reducing pressure within the mixing reservoir; and  
maintaining the mixing reservoir at the reduced pressure.
32. The method of claim 31, wherein the reducing and maintaining  
comprises placing the mixing reservoir under a vacuum of at least about 29" Hg.  
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33. The method of claim 27, further comprising degassing the additive  
before receiving the additive within the mixing reservoir.
34. The method of claim 27, wherein the actively cooling comprises:  
30 receiving the mixture within a heat exchanger to cool the mixture by  
thermal energy transfer from the mixture to the heat exchanger; and  
returning the mixture from the heat exchanger to the mixing  
reservoir.

35. The method of claim 27, wherein the actively cooling comprises:  
receiving the mixture within a heat exchange coil at least partially  
positioned within a fluid to cool the mixture by thermal energy transfer from  
the mixture to the fluid; and  
5 returning the mixture from the heat exchange coil to the mixing  
reservoir.
36. The method of claim 27, wherein the ultrasonically dispersing  
comprises:  
10 positioning a sonotrode within the mixing reservoir; and  
applying energy to the sonotrode to generate ultrasonic energy  
which propagates through the base within the mixing reservoir.
37. The method of claim 27, wherein the receiving an additive within the  
15 mixing reservoir comprises receiving pigment particles within the mixing  
reservoir.
38. The method of claim 27, wherein the receiving a coating component  
within a mixing reservoir comprises receiving a binder within the mixing reservoir.  
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39. The method of claim 27, wherein the receiving a coating component  
within a mixing reservoir comprises receiving a solvent within the mixing  
reservoir.
- 25 40. The method of claim 27, wherein the receiving a coating component  
within a mixing reservoir comprises receiving a resin carrier within the mixing  
reservoir.